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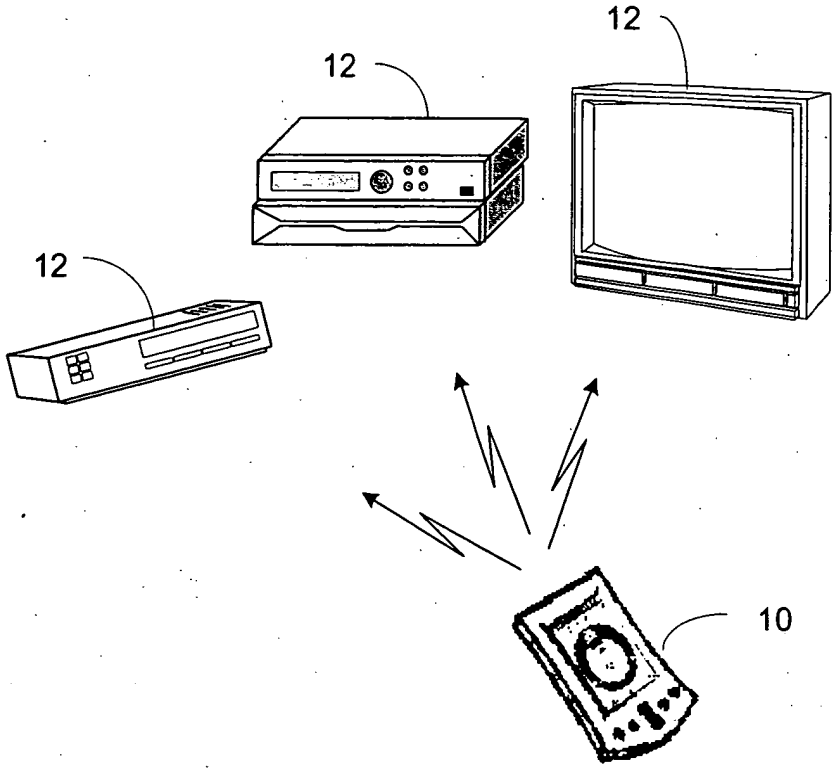


FIGURE 1

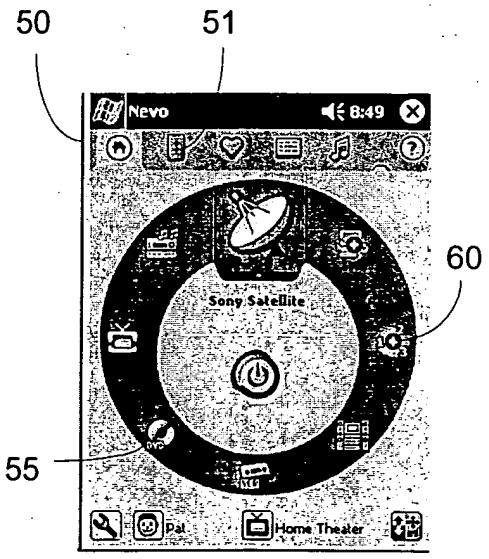


FIGURE 2a

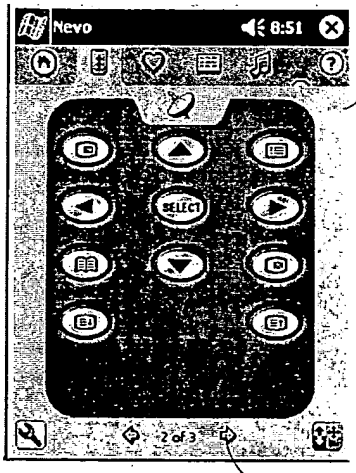


FIGURE 2b

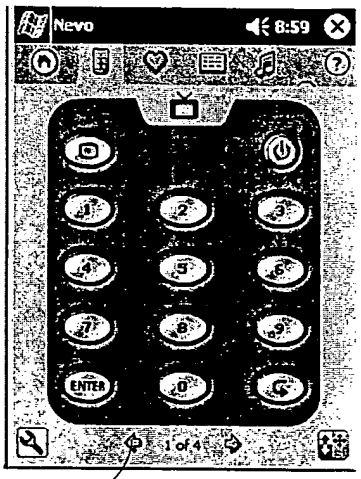


FIGURE 2c

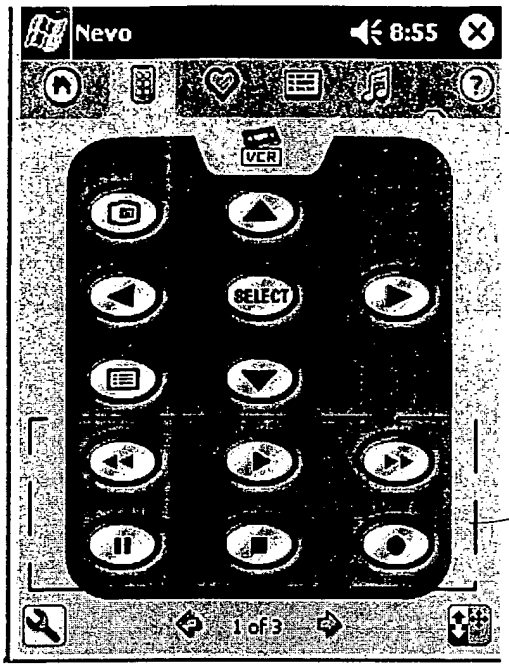


FIGURE 3a

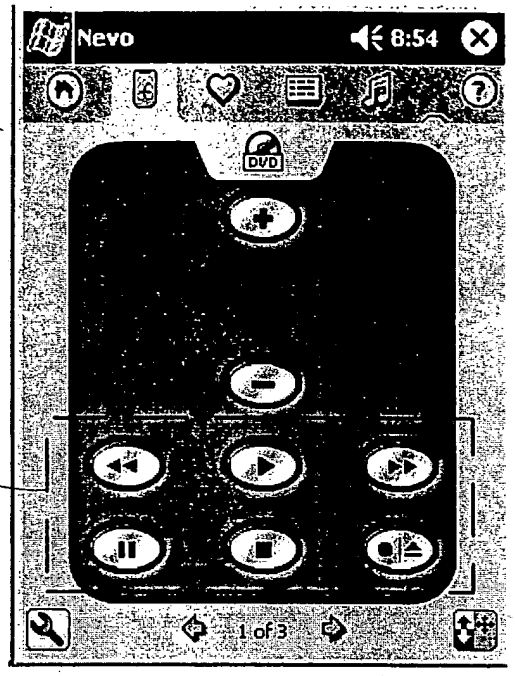


FIGURE 3b

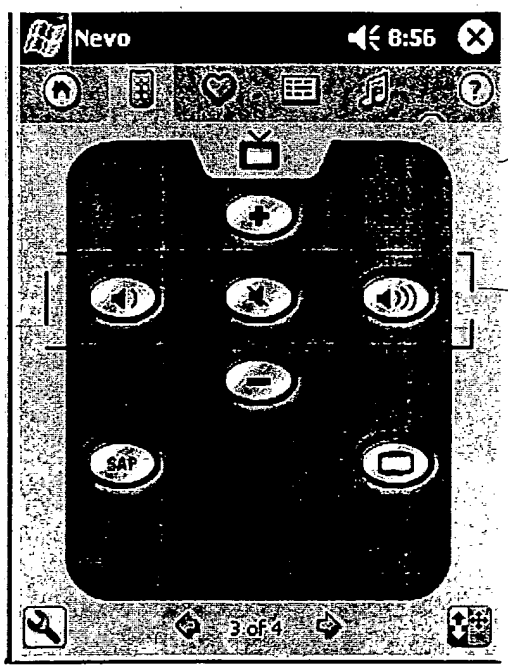


FIGURE 4a

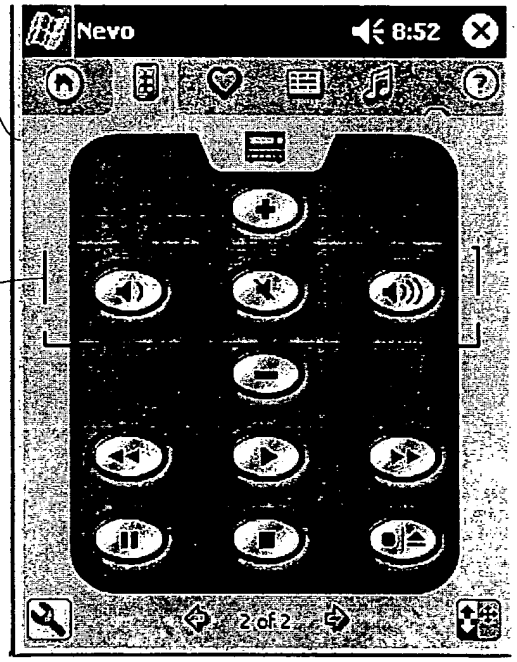


FIGURE 4b

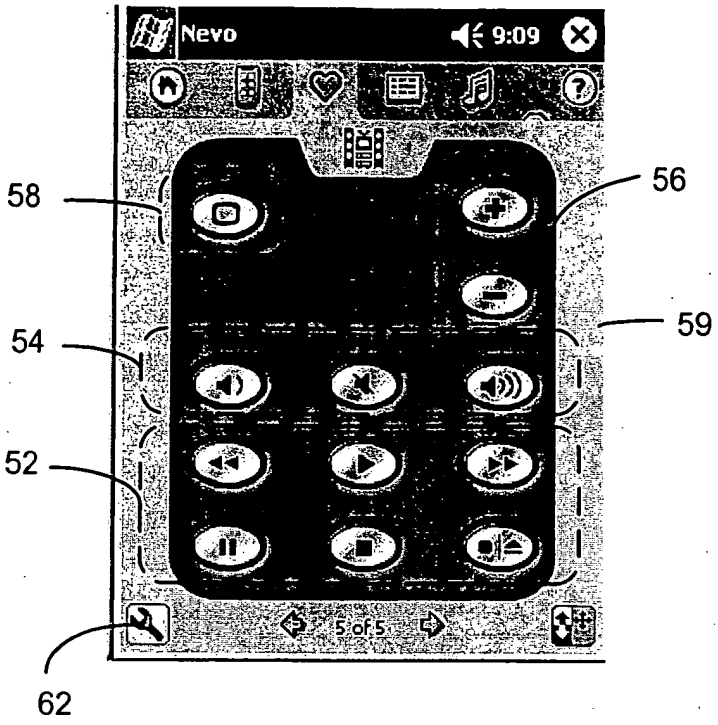


FIGURE 5

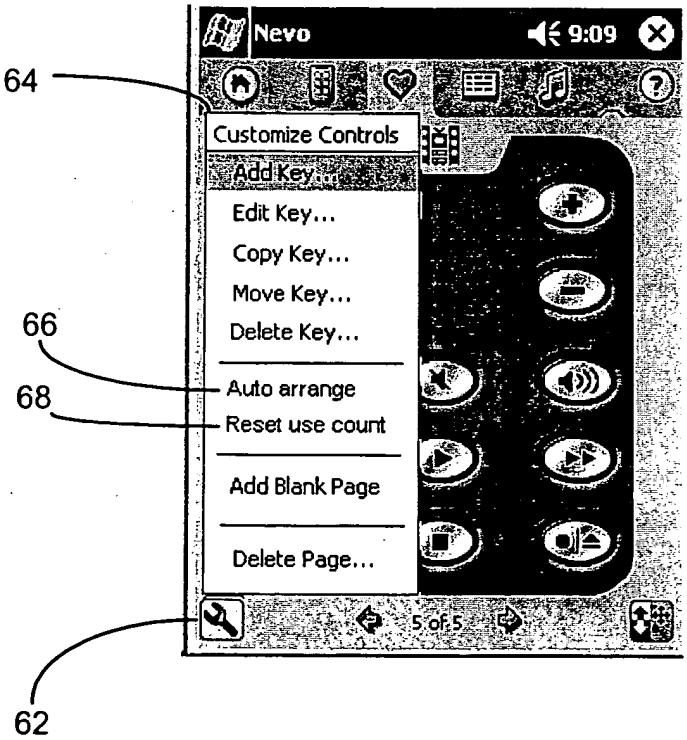


FIGURE 6

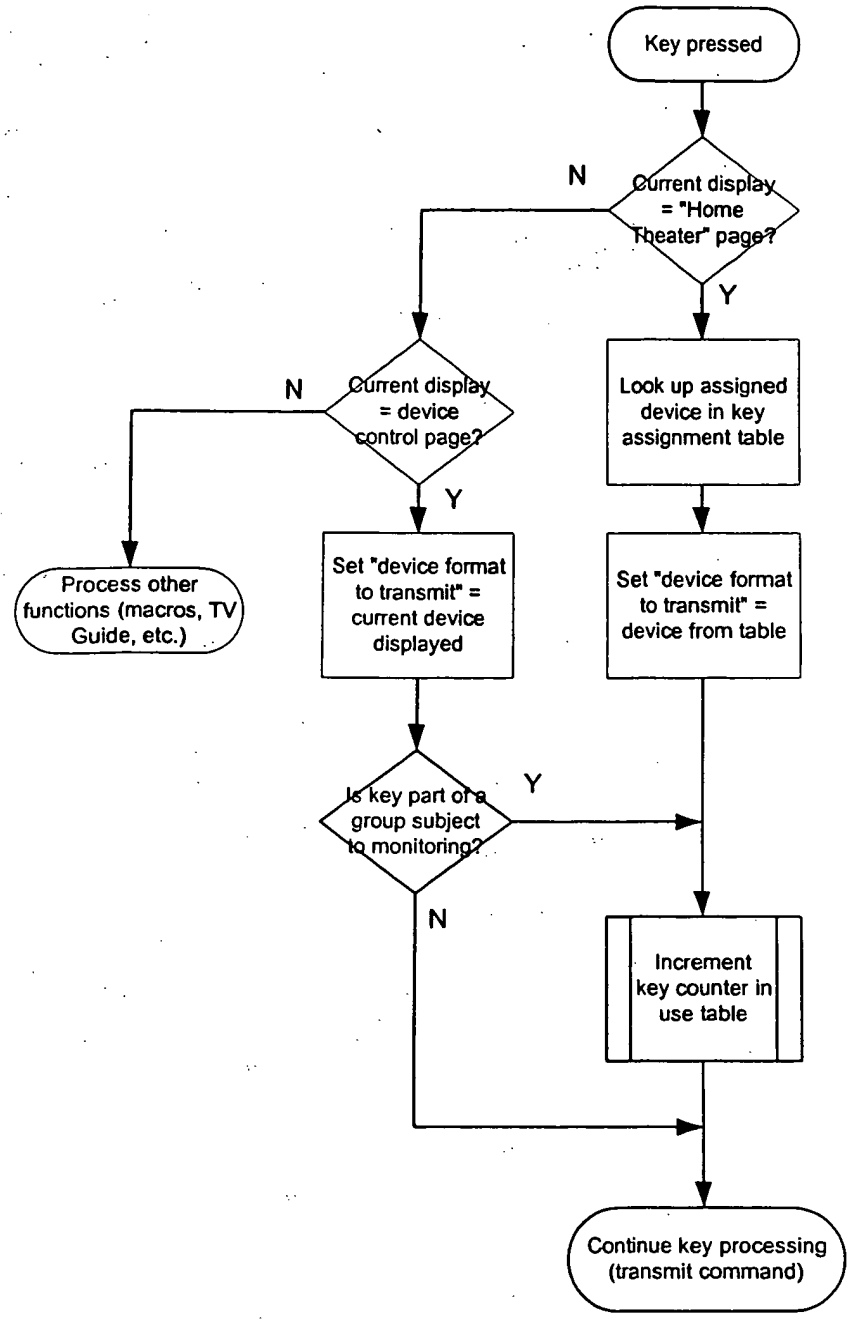

Key pressed
Current display = "Home Theater" page?
N
Y
Look up assigned device in key assignment table
Current display = device control page?
N
Y
Process other functions (macros, TV Guide, etc.)
Set "device format to transmit" = current device displayed
Set "device format to transmit" = device from table
Is key part of a group subject to monitoring?
Y
N
Increment key counter in use table
Continue key processing (transmit command)

FIGURE 7

		TV	SAT	VCR	DVD	RCVR	etc..
Group 1	Play	X	X	19	47	0	
	Stop	X	X	15	39	0	
	Fast forward	X	X	3	8	0	
	Rewind	X	X	10	2	0	
	Pause	X	X	4	53	0	
Group 2	Volume up	83	X	0	X	279	
	Volume down	79	X	0	X	383	
	Mute	52	X	0	X	140	
Group 3	Channel up	12	158	5	0	0	
	Channel down	11	86	11	0	0	
Group 4	Input select	77	X	2	X	15	

FIGURE 8

Play	DVD
Stop	DVD
Fast forward	DVD
Rewind	DVD
Pause	DVD
Volume up	RCVR
Volume down	RCVR
Mute	RCVR
Channel up	SAT
Channel down	SAT
Input select	TV

FIGURE 9

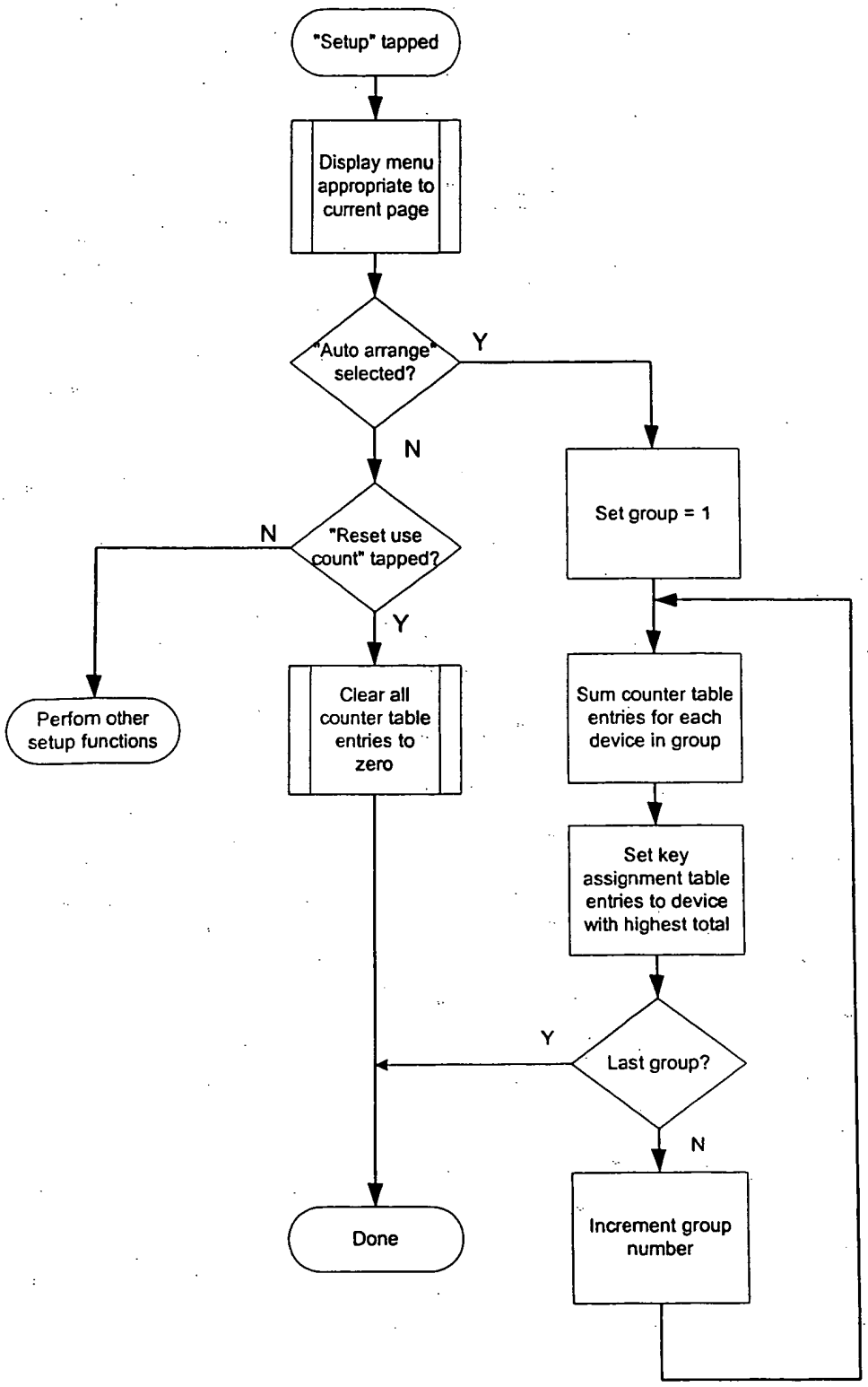

"Setup" tapped
Display menu appropriate to current page
"Auto arrange" selected?
Y
N
"Reset use count" tapped?
N
Y
Perfom other setup functions
Clear all counter table entries to zero
Set group = 1
Sum counter table entries for each device in group
Set key assignment table entries to device with highest total
Last group?
Y
N
Increment group number
Done

FIGURE 10

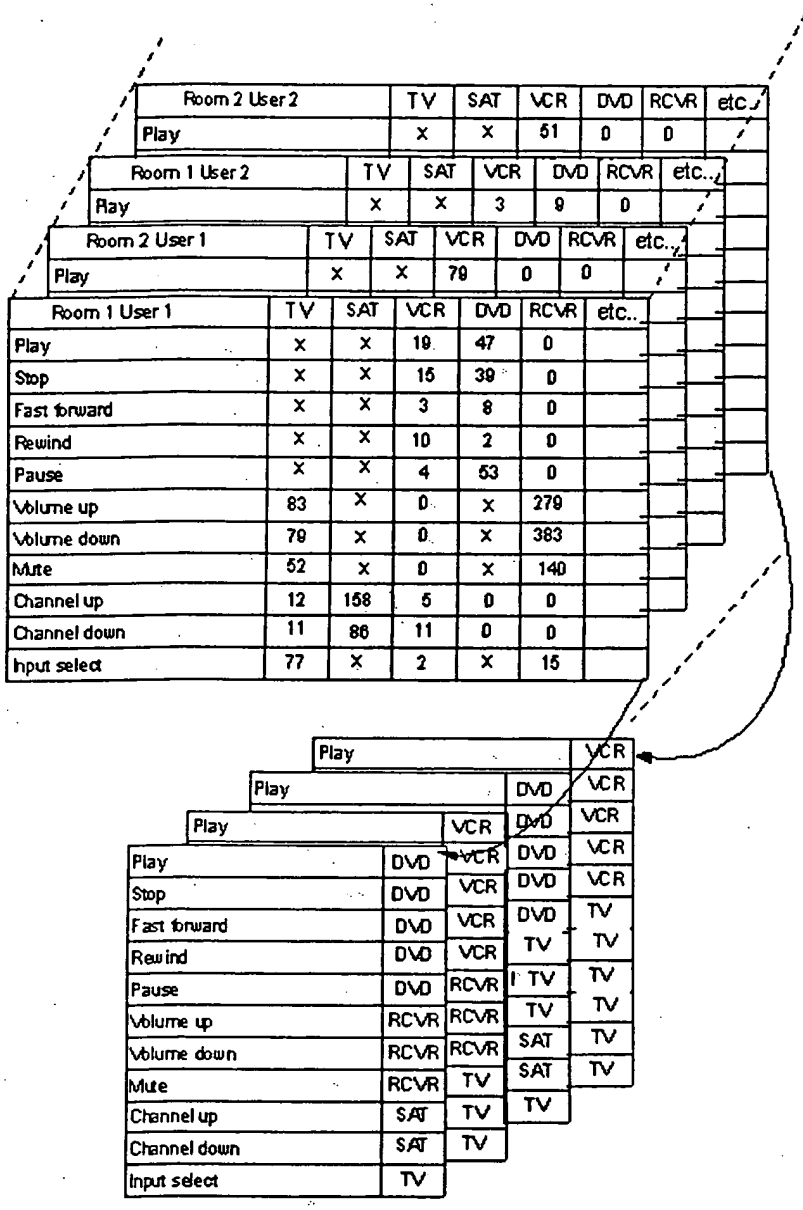

Room 2 User 2 | TV | SAT | VCR | DVD | RCVR | etc..
Play | x | x | 51 | 0 | 0
Room 1 User 2 | TV | SAT | VCR | DVD | RCVR | etc..
Play | x | x | 3 | 9 | 0
Room 2 User 1 | TV | SAT | VCR | DVD | RCVR | etc..
Play | x | x | 79 | 0 | 0
Room 1 User 1 | TV | SAT | VCR | DVD | RCVR | etc..
Play | x | x | 19 | 47 | 0
Stop | x | x | 15 | 39 | 0
Fast forward | x | x | 3 | 8 | 0
Rewind | x | x | 10 | 2 | 0
Pause | x | x | 4 | 53 | 0
Volume up | 83 | x | 0 | x | 279
Volume down | 79 | x | 0 | x | 383
Mute | 52 | x | 0 | x | 140
Channel up | 12 | 158 | 5 | 0 | 0
Channel down | 11 | 86 | 11 | 0 | 0
Input select | 77 | x | 2 | x | 15
Play | VCR
Play | DVD
Play | VCR
Play | DVD
Stop | DVD
Fast forward | DVD
Rewind | DVD
Pause | DVD
Volume up | RCVR
Volume down | RCVR
Mute | RCVR
Channel up | SAT
Channel down | SAT
Input select | TV
VCR
VCR
VCR
VCR
VCR
VCR
TV
TV
TV
TV
TV
TV
TV
TV
TV
TV
TV
TV

FIGURE 11

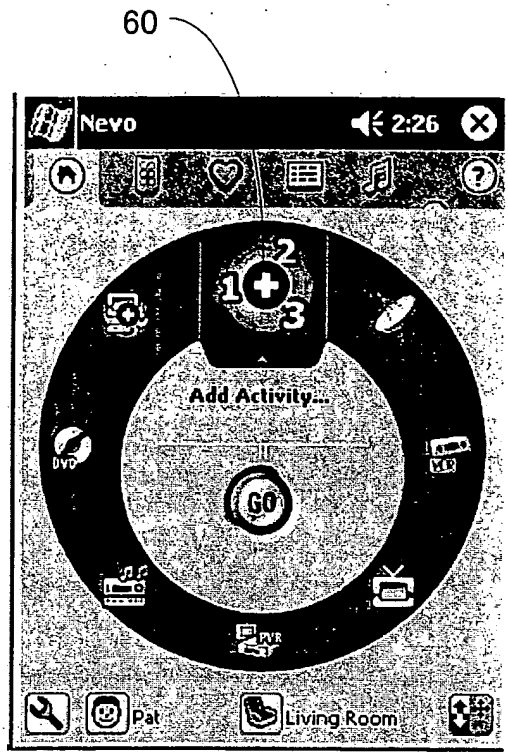


FIGURE 12 a

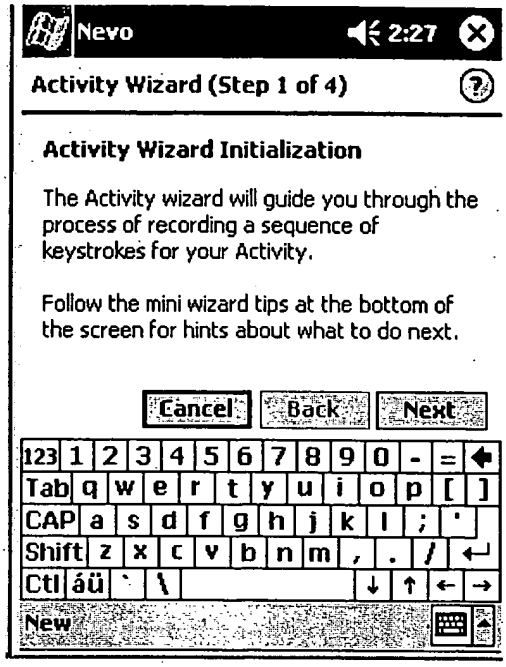


FIGURE 12 b

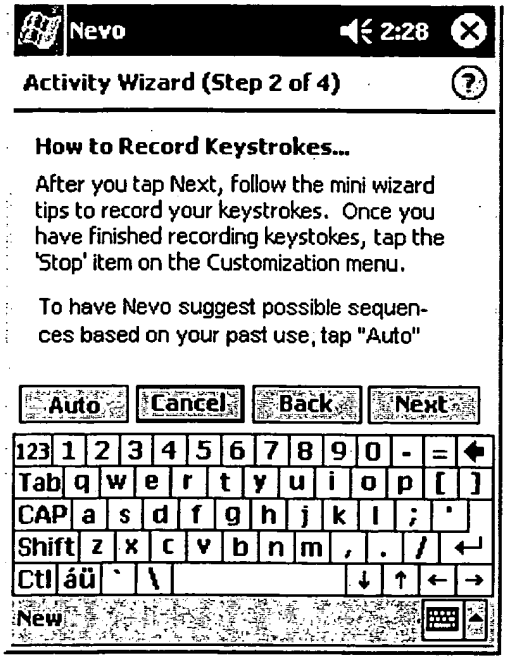


FIGURE 12 c

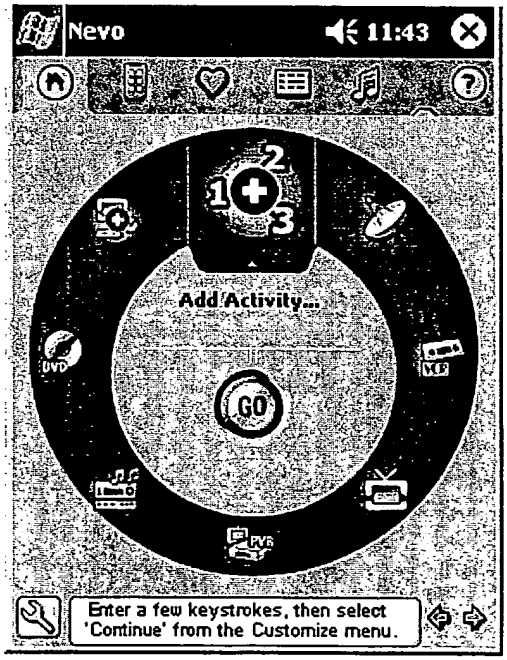


FIGURE 12 d

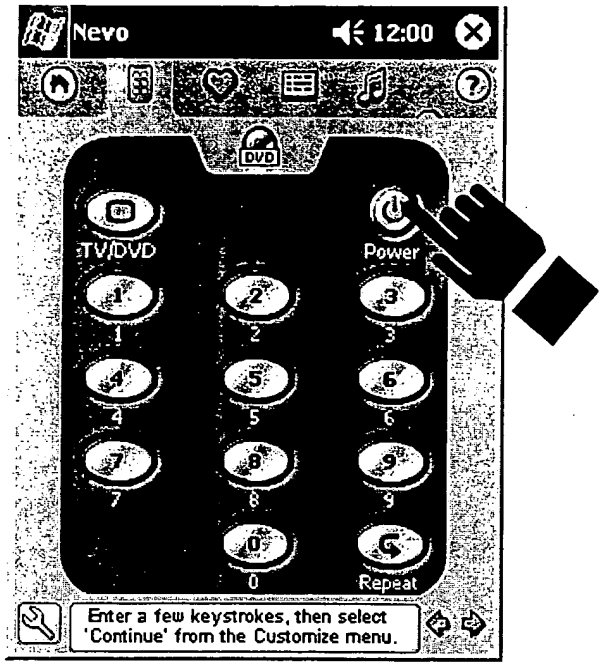


FIGURE 12 e

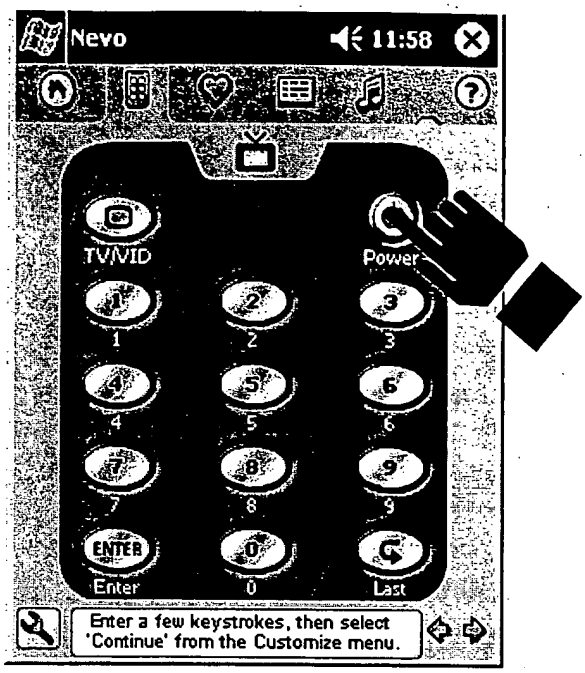


FIGURE 12 f

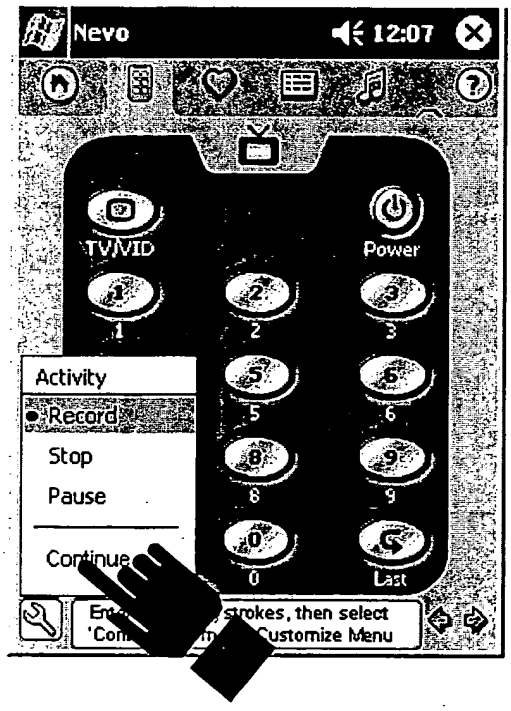


FIGURE 12 g

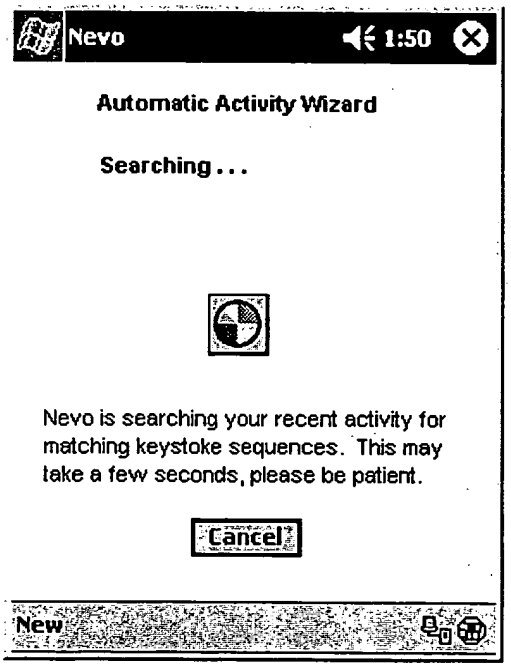


FIGURE 12 h

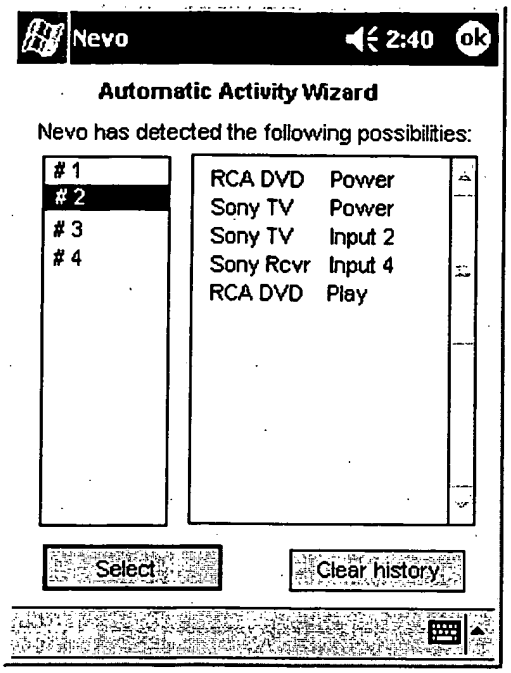


FIGURE 12 i

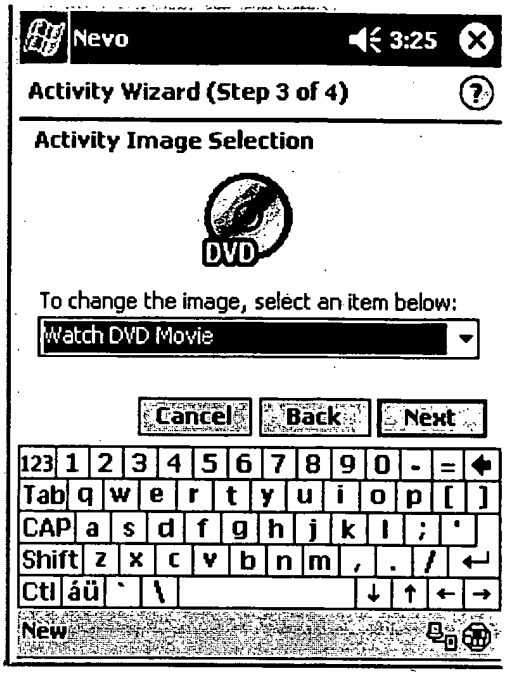


FIGURE 12 j

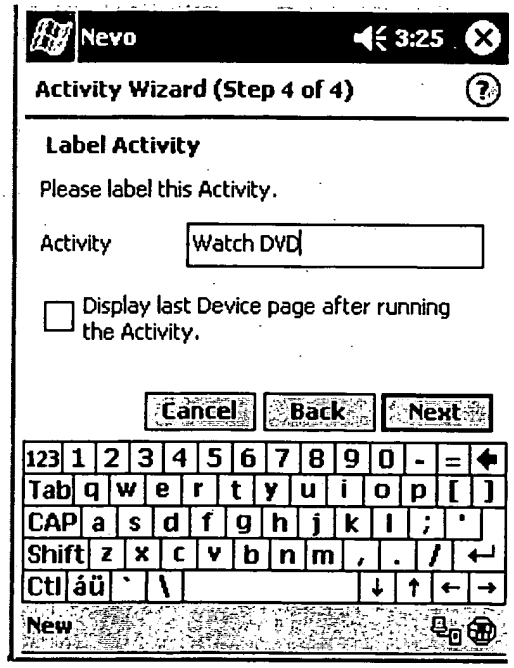


FIGURE 12 k

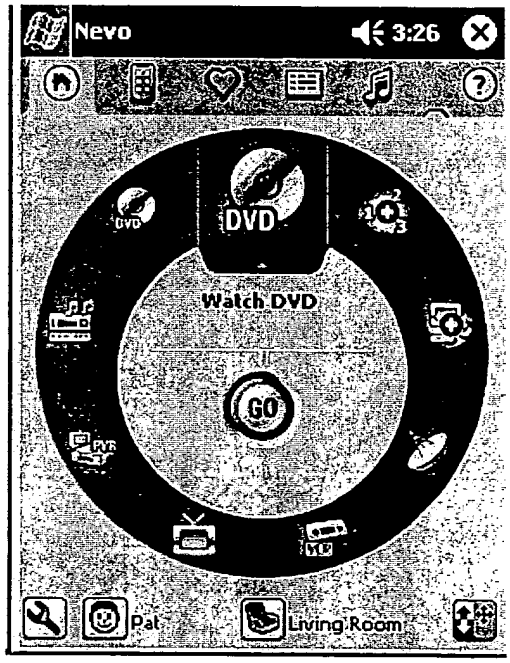


FIGURE 12 l

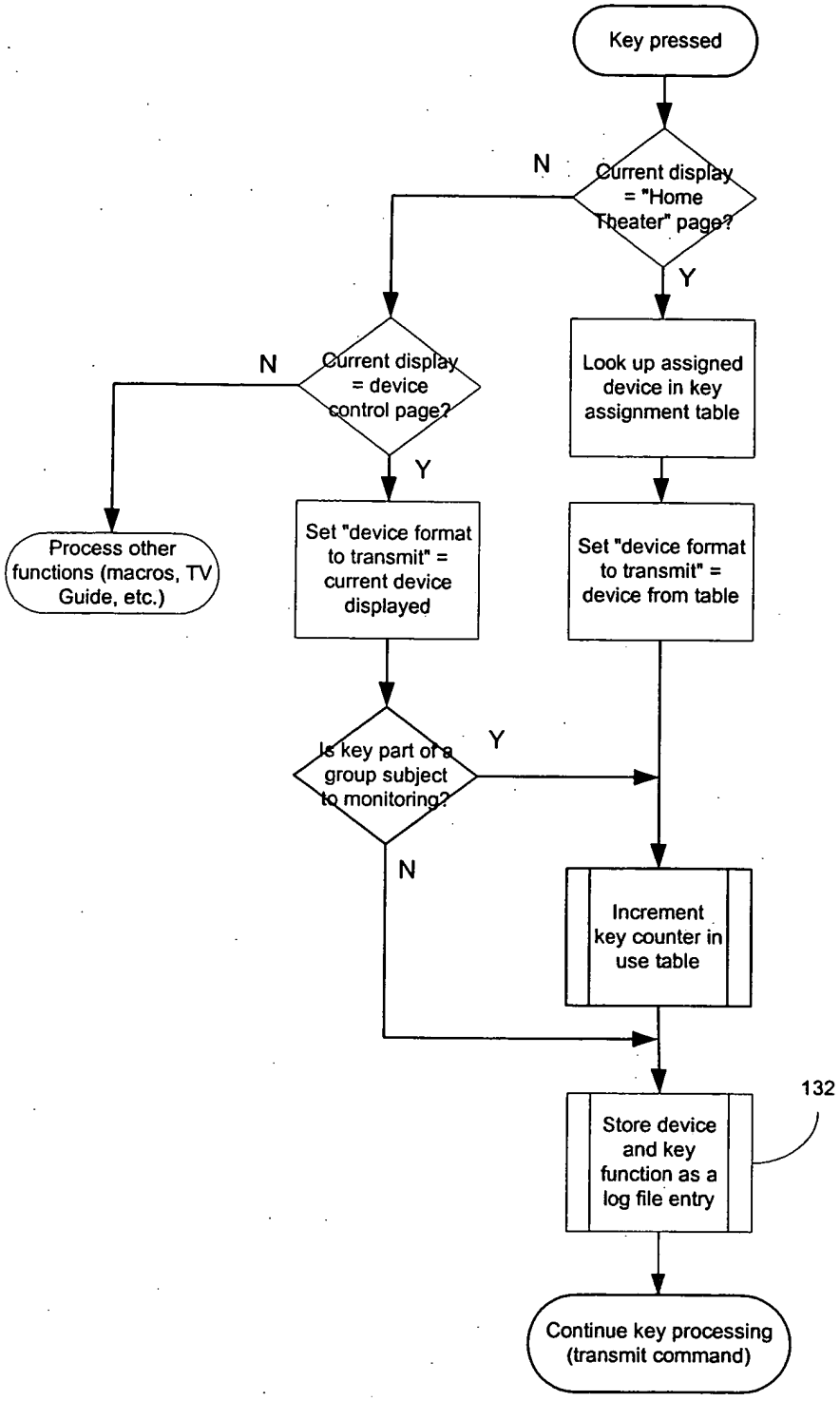

Key pressed
Current display = "Home Theater" page?
N
Y
Look up assigned device in key assignment table
Current display = device control page?
N
Y
Process other functions (macros, TV Guide, etc.)
Set "device format to transmit" = current device displayed
Set "device format to transmit" = device from table
Is key part of a group subject to monitoring?
Y
N
Increment key counter in use table
132
Store device and key function as a log file entry
Continue key processing (transmit command)

FIGURE 13

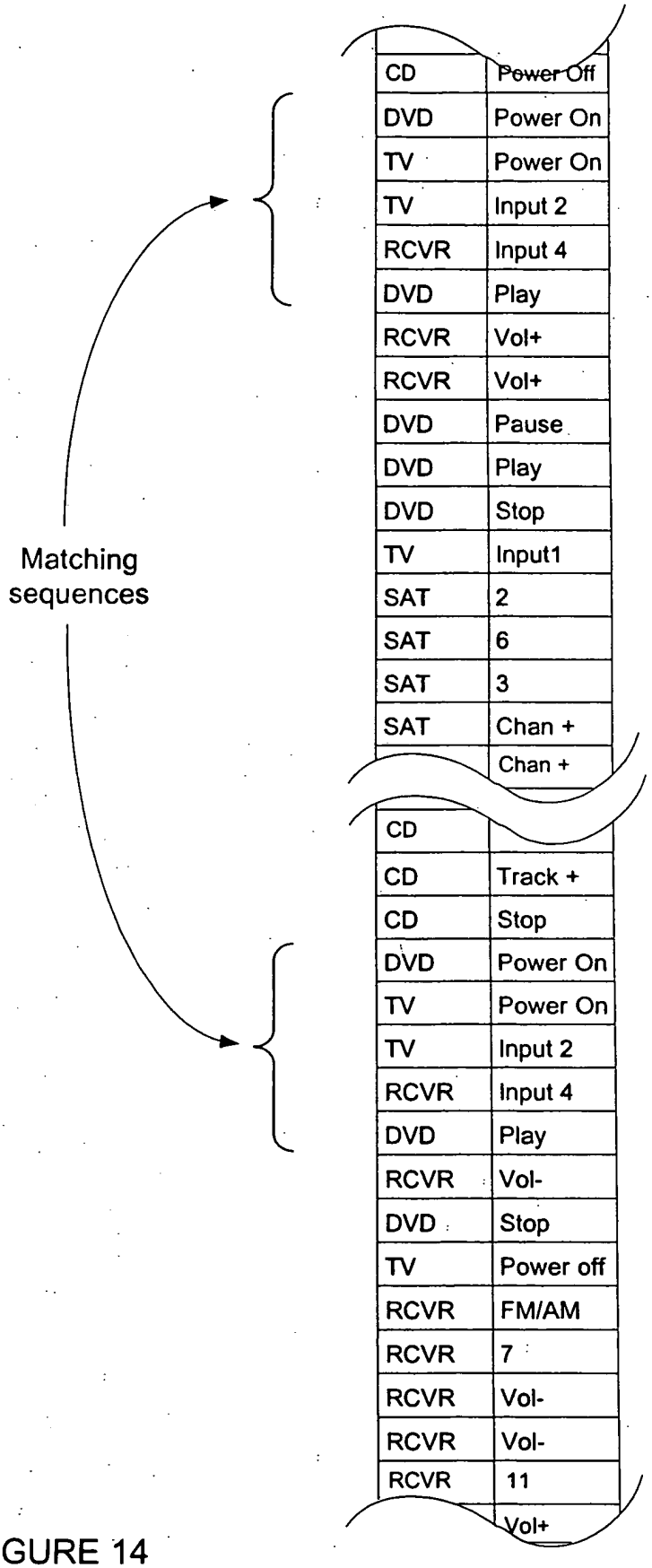

Matching sequences
CD Power Off
DVD Power On
TV Power On
TV Input 2
RCVR Input 4
DVD Play
RCVR Vol+
RCVR Vol+
DVD Pause
DVD Play
DVD Stop
TV Input1
SAT 2
SAT 6
SAT 3
SAT Chan +
Chan +
CD
CD Track +
CD Stop
DVD Power On
TV Power On
TV Input 2
RCVR Input 4
DVD Play
RCVR Vol-
DVD Stop
TV Power off
RCVR FM/AM
RCVR 7
RCVR Vol-
RCVR Vol-
RCVR 11
Vol+

FIGURE 14

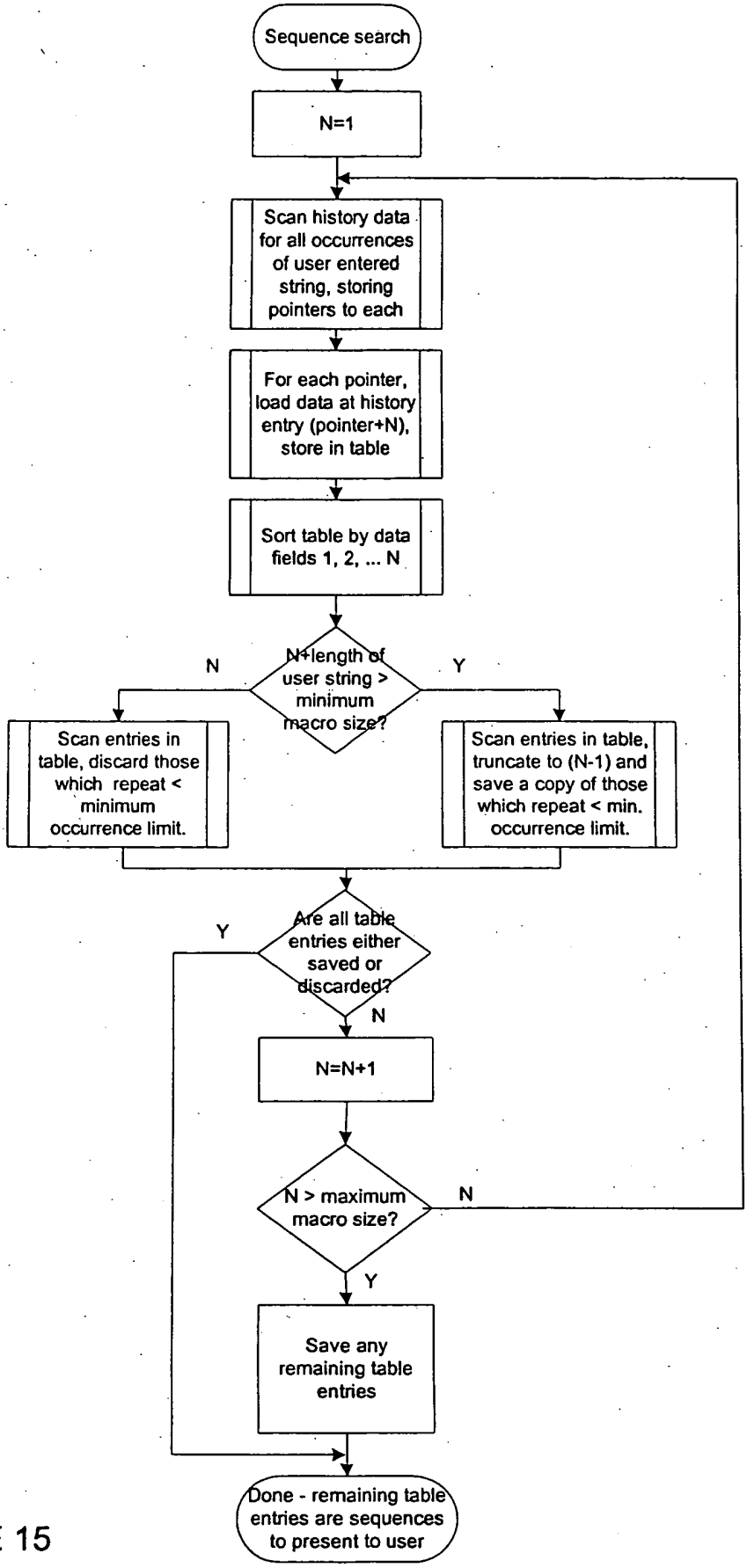
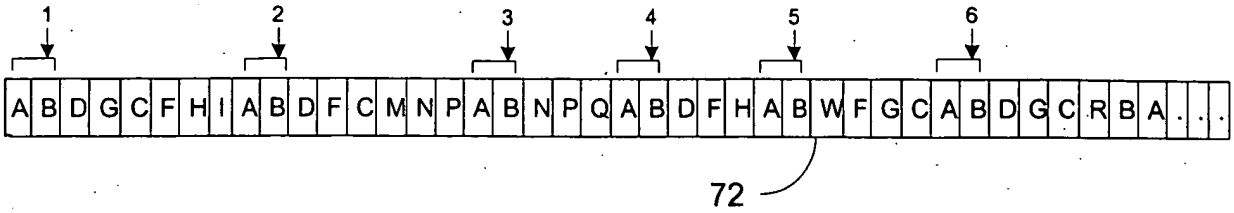

Sequence search
N=1
Scan history data for all occurrences of user entered string, storing pointers to each
For each pointer, load data at history entry (pointer+N), store in table
Sort table by data fields 1, 2, ... N
N+length of user string > minimum macro size?
N
Y
Scan entries in table, discard those which repeat < minimum occurrence limit.
Scan entries in table, truncate to (N-1) and save a copy of those which repeat < min. occurrence limit.
Are all table entries either saved or discarded?
Y
N
N=N+1
N > maximum macro size?
N
Y
Save any remaining table entries
Done - remaining table entries are sequences to present to user

FIGURE 15

Sample history data. (User entered "AB" as start of desired sequence.)



Iteration 1:

74a

Pointer	Data value
	N=1
1	D
2	D
3	N
4	D
5	W
6	D

SORT

74b

Pointer	Data value
	N=1
1	D
2	D
4	D
6	D
3	N
5	W

Discard (too short)

Iteration 2:

74c

Pointer	Data value	
	N=1	N=2
1	D	G
2	D	F
4	D	F
6	D	G

SORT

74d

Pointer	Data value	
	N=1	N=2
2	D	F
4	D	F
1	D	G
6	D	G

FIGURE 16

Iteration 3:

74e

Pointer	Data value		
	N=1	N=2	N=3
2	D	F	C
4	D	F	H
1	D	G	C
6	D	G	C

SORT

74f

Pointer	Data value		
	N=1	N=2	N=3
2	D	F	C
4	D	F	H
1	D	G	C
6	D	G	C

Save "ABDF"

Iteration 4:

74g

Pointer	Data value			
	N=1	N=2	N=3	N=4
1	D	G	C	F
6	D	G	C	R

SORT

74h

Pointer	Data value			
	N=1	N=2	N=3	N=4
1	D	G	C	F
6	D	G	C	R

Save "ABDGC"

Iteration 5: Completion -- data table empty, all entries either discarded or saved.

Sequences found and saved: ABDF and ABDGC

FIGURE 16 (continued)

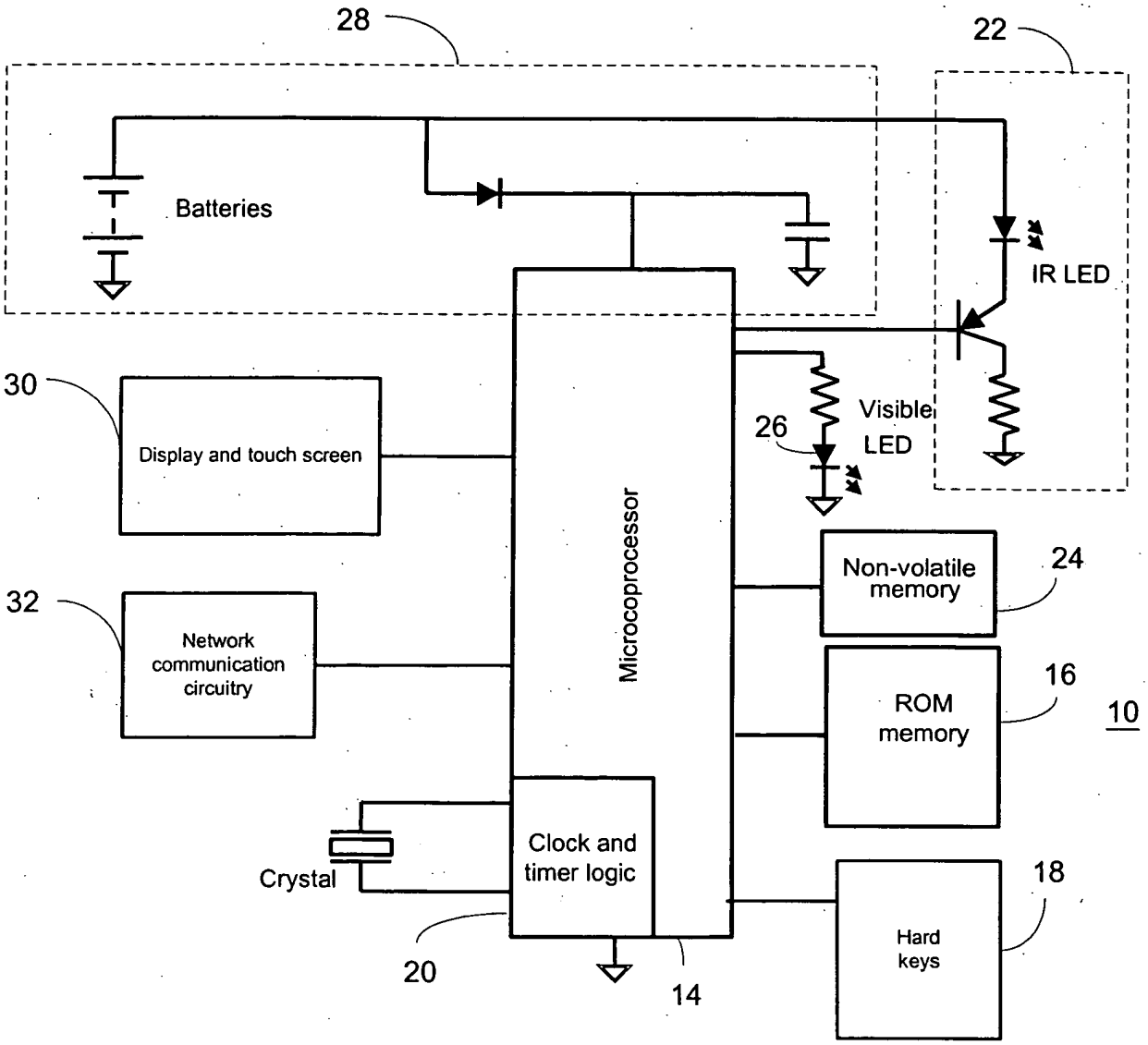

28
22
Batteries
IR LED
30
Display and touch screen
26
Visible
LED
Microcoprocessor
Non-volatile
memory
24
32
Network
communication
circuitry
16
ROM
memory
10
Crystal
Clock and
timer logic
18
Hard
keys
20
14

FIGURE 17